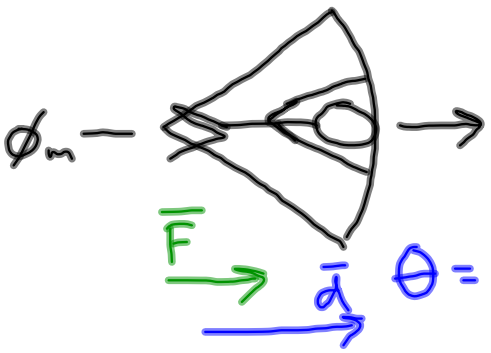
An average force of 587.5 N is exerted as the Coyote stretches the string back on a giant bow. The string is moved back a distance of 0.744 m as he inserts his body in the box. His mass is 14.57 kg, and it takes him 3.0 s to do this task. He points himself in a horizontal direction, and when the Road Runner passes he takes off from the bow. How fast is he going at his maximum horizontal velocity?



height doesn't change

$W = \Delta E$

$V_i = 0$ m/s

$= (K_f - K_i) + (U_{gf} - U_{gi})$

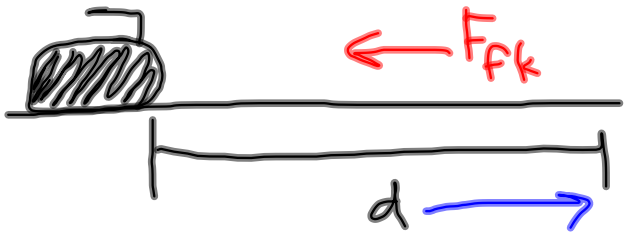
$F d \cos\theta = \frac{1}{2} m v_f^2$

$v_f = \sqrt{\frac{2Fd}{m}}$

$= \sqrt{\frac{2(587.5\,N)(.744m)}{14.57\,kg}}$

$= 7.75$ m/s

On a frozen pond, a person slides a 10.0 kg curling stone, giving it an initial speed of 2.2 m/s. How far does the curling stone move if the coefficient of kinetic friction between the curling stone and the ice is 0.10?



$\theta = 180°$

$W = (K_f - K_i) + (U_{gf} - U_{gi})$ → $\emptyset$

$v_f = \emptyset\ m/s$

$F_{fk} d \cos\theta = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2$ ($\cos\theta = -1$; $\frac{1}{2}mv_f^2 \to \emptyset$)

$+F_{fk} d = +\frac{1}{2}mv_i^2$

$d = \frac{mv_i^2}{2F_{fk}}$

$= \frac{(10\ kg)(2.2\ m/s)^2}{2(9.8\ N)}$

$= 2.47\ m$

$\Sigma F_y = \emptyset$

$F_N = F_g$

$F_{fk} = \mu_k F_N$

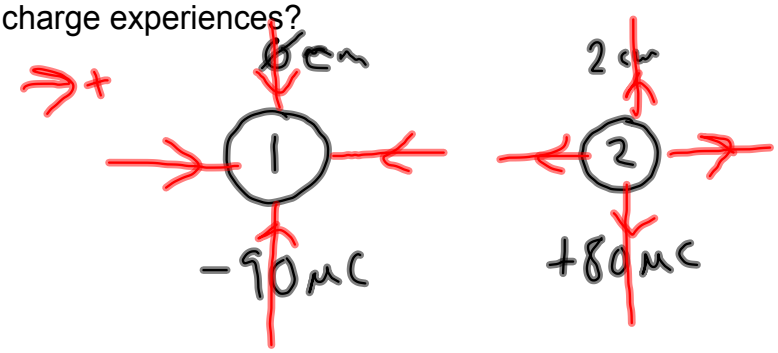
$= \mu_k F_g$

$= \mu_k mg$

$= (.1)(10\ kg)(9.8\ m/s^2)$

$= 9.8\ N$

Two charges are arranged in a line. Charge 1 has a value of -90 microC and is located at the origin, charge 2 has a value of +80 microC and is located at x = 2 cm.
a) Find the value of the electric field at the point x = 5 cm.
b) If a charge of +50 microC is placed at this point, what is the electric force that the charge experiences?



a) $\bar{E}_{net} = \bar{E}_1 + \bar{E}_2$

$$= \frac{-k|q_1|}{r_1^2} + \frac{k|q_2|}{r_2^2}$$

$$= (8.99E9\ N\cdot m^2/C^2)\left[\frac{-90E\text{-}6\ C}{(.05\ m)^2} + \frac{80E\text{-}6\ C}{(.03\ m)^2}\right]$$

$$= 4.75E8\ N/C$$

b) $\bar{E} = \frac{\bar{F}}{q}$

$$\bar{F} = q\bar{E}$$

$$= (50E\text{-}6\ C)(4.75E8\ N/C)$$

$$= 22750\ N$$

Find all V's and I's:

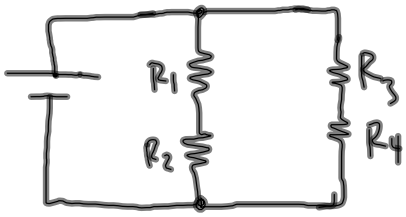
$R_1 = 70\,\Omega$

$R_2 = 90\,\Omega$

100 V

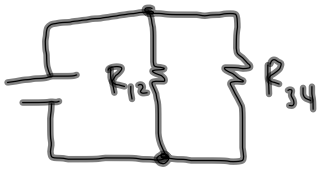
$R_3 = 110\,\Omega$

$R_4 = 85\,\Omega$



$R_{eq} = R_1 + R_2 + \dots$

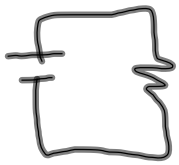
$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$



$R_{12} = 160\,\Omega$

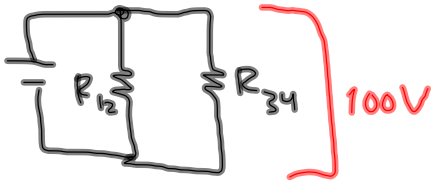
$R_{34} = 195\,\Omega$

$V = IR$



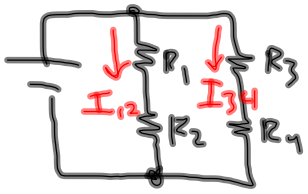
$R_{eq} = 87.9\,\Omega$

$$I_{total} = \frac{V_{battery}}{R_{eq}} = \frac{100\,V}{87.9\,\Omega} = 1.14\,A$$



$$I_{12} = \frac{100\,V}{R_{12}} = 0.625\,A$$

$$I_{34} = \frac{100\,V}{R_{34}} = 0.513\,A$$



$V_1 = I_{12} R_1 = 43.8\,V$

$V_2 = I_{12} R_2 = 56.2\,V$

$V_3 = I_{34} R_3 = 56.4\,V$

$V_4 = I_{34} R_4 = 43.6\,V$

object height is 10 cm

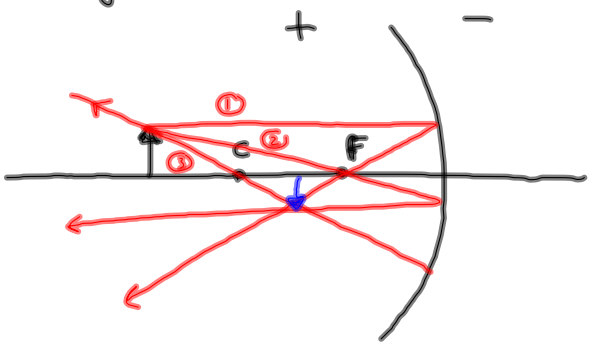
focal length is 15 cm

find M, d_i, h_i

image characteristics

concave mirror

object distance is 45 cm



$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f}$$

$$d_i = \left[\frac{1}{f} - \frac{1}{d_o}\right]^{-1}$$

$$= 22.5 \text{ cm}$$

$$M = -\frac{d_i}{d_o}$$

$$= -\frac{22.5 \text{ cm}}{45 \text{ cm}}$$

$$= -0.5$$

$$M = \frac{h_i}{h_o}$$

$$h_i = M h_o$$

$$= (-.5)(10 \text{ cm})$$

$$= -5 \text{ cm}$$

inverted, smaller, real